ROCKS AND MINERALS

A Magazine for Mineralogists, Geologists and Collectors . . .

Official Journal of the Rocks and Minerals Association

February, 1941

Vol. 16, No. 2 Twenty-Five Cents Whole No. 115

THE ROCKS AND MINERALS ASSOCIATION

PEEKSKILL, N. Y.

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Organized in 1928 for the increase and dissemination of mineralogic knowledge

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To stimulate public interest in geology and mineralogy and to endeavor to have courses in these subjects introduced in the curricula of the public school systems; to revive a general interest in minerals and mineral collecting; to instruct beginners as to how a collection can be made and cared for; to keep an accurate and permanent record of all mineral localities and minerals found there and to print same for distribution; to encourage the search for new minerals that have not yet been discovered; and to endeavor to secure the practical conservation of mineral localities and unusual rock formations.

Ever since its foundation in 1928, the Rocks and Minerals Association has done much to promote the interest in mineralogy. It has sponsored outings, expeditions, formations of mineralogical clubs and the printing of many articles that have been a distinct contribution to mineralogy.

Those of our readers who are members of the Association can rightly feel that they too were sponsors of these many achievements that have helped to give mineralogy a national recognition. Among your frineds there must be many who would like to have a part in the Association's work—to share with you the personal satisfaction, the pleasure, and the benefits of membership. Will you give your friends this opportunity to join the Association by nominating them for membership?

Each new member helps to extend the Association's activities—helps to make your magazine larger, better, and more interesting, and above all assists in the dissemination of mineralogical knowledge.

Some advantages of membership: All members in good standing receive:

(1) **Rocks and Minerals,** a monthly magazine. (2) A member's identification card that secures the privileges of many mines, quarries, clubs, societies, museums, libraries. (3) The right to participate in outings and meetings arranged by the Association. (4) The right to display a certificate of membership and to place after their names a designation indicating their membership or to advertise membership on stationery, etc. (5) The distinction and the endorsement which comes from membership in the world's largest mineralogical society.

Mineralogical clubs which subscribe for **Rocks and Minerals** also become affiliated members of the Rocks and Mineral Association and enjoy all the advantages which such an affiliation affords.

A number of clubs hold membership in the Association, participate in the annual outings, and co-operate in many ways in furthering the aims and ambitions of the Association.

Affiliation with the world's largest mineralogical society cannot fail to increase membership, enlarge circles of acquaintanceship, and stimulate a keener interest in mineralogy.

A list of affiliated clubs will be found among the back pages of the magazine.

Rocks and Minerals

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Edited and Published by PETER ZODAC

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ROCKS and MINERALS PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

Chips From The Quarry

THE GROWING INTEREST IN MINERALOGY

One of the most encouraging signs in recent months that mineral collecting is on the increase is the large number of collectors who are acquiring fine mineralogical libraries. Not only are the newest books on their shelves but many rare and out of print volumes and bulletins are also present. In fact some of the new collectors, by virtue of their libraries, are so thoroughly posted on the localities of their own and adjoining states that it is truly amazing how much knowledge they have acquired in the short time that they have been collecting. Furthermore, this has resulted in their finding of many interesting minerals which have not only enriched their own collections but also, through gifts and exchange, enriched the collections of others.

What has aroused this keen and most commendable interest to possess on his library's shelves all the printed information one can secure upon the science of mineralogy? Is it that more books, written in so-called popular form, have been prepared for the market and have been found to be stimulating as well as informative by those, who have heretofore been deterred by the mathematical and theoretical knowledge each believed he must obtain to enjoy minerals and mineral collecting? Or it is that we now find it possible to enter this delightful field without taking a college course? These books would not have been written or printed if there had not been a demand for them, and we would like to believe that ROCKS AND MINERALS has had some influence not only in showing that mineralogy can be presented to anyone in language simple enough to be understood by the amateur, but to make it of interest to the professional even though lacking in technical terms. But whether we can claim any credit of not, we rejoice in this marked renewal of interest in mineralogy, for that has been one of the principal aims of ROCKS AND MINERALS from the beginning and be assured this magazine will continue to work and encourage this growing interest by endeavoring to be what we believe it to be to-day, the best nontechnical mineral magazine that is published.

Peter Zodac

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Whole No. 115

AN ENGLISH TRAVELER IN SIBERIA

Being excerpts made by Dr. A. C. Hawkins for ROCKS AND MINERALS from the book "Oriental and Western Siberia," a Narrative of Seven Years' Explorations and Adventures in Siberia, Mongolia, Kirghis Steppes, Chinese Tartary, and parts of Central Asia, by Thomas Witlam Atkinson, Hurst & Blackett, Publishers, London, 1858. All spellings are those of the author and of course some of his geological ideas are according to his and not our modern standards. (Oural for example is Ural).

Printed by permission of the publishers, Hurst & Blackett, Paternoster Row, London, England.

(The figures in parenthesis denote page numbers of the book on which the material appears).

(13) *In Ekaterineburg*: Having slept well, I turned out early in the morning, and walked over the iron-works, with which I was greatly interested. They are well conducted, and produce a large quantity of very good metal. (Tchoussowaia River) We descended the river rapidly—and arrived at Outkinskoi Pristan at eleven o'clock. This is the place where most of the barques are built to convey the produce of the Oural mines and iron-works, belonging to the crown, to Nijne-Novgorod.

(14) Barques are built to convey the produce of the Oural mines and iron-works to Nijne-Novgorod, Moscow, and St. Petersburg. The barques are built on the bank of the Tchoussowaia with their sides to the stream; they are flat-bottomed, with straight sides 125 feet long, have a breadth of 25 feet, and are from 8 to 9 feet deep; the head and stern are formed by a sort of obtuse angle, the ribs of birch-trees selected for the purpose, and the planking of deal; there is not a nail, or an iron bolt in them, they being put together with wooden pins; and they must be built the year before they are launched. The decks are formed with strong boards framed together, but not fastened to the barque; a precaution absolutely necessary, as they are often sunk in deep water after striking the rocks. When this happens, the deck floats, by which the men are saved.

It was now a scene of great activity, there being four thousand men in this small village, brought from various places—all diligently engaged in loading the vessels with guns of large dimensions, made in Kamenskoi Zavod; also with shot, shell and other munitions of war from the different works in the South Oural, destined for Sevastopol and the forts on the black sea. In some places I passed masses of rock most curiously thrown up and broken,—affording abundant proof that at some very remote period volcanic agency had been at work.

(18) In many parts the strata, which had once been horizontal, were now turned up, and curved into most

extraordidnary forms, and other substances forced through them. I saw in the limestone rock several apparently large caverns; but it was impossible to enter them in the then state of the flood. Had our boat touched the rocks she would have gone to pieces in a minute, and no one would have been left to tell the tale.—Again I noticed most singular contortions of the strata, —some forced up in curves, others in triangles. and some rose almost perpendicular, giving great variety and picturesque beauty to these wild gorges. —The limestone rocks are broken and twisted into every variety of form, rising in many parts 300 or 400 feet in height.

(43) The earthquake which occurred on the 15th of April was felt severly at Cynowskoi iron-works; a terrible growling sound, like subterranean thunder at a great depth under ground, was instantly followed by a violent motion of the earth, causing great alarm to every one. I was told that the horses trembled as it passed.

(52) Nijne Toura is a Zavod belonging to a Crown, in which a large quantity of excellent bar-iron is made from the magnetic ores of Blagodat. It is beautifully situated on the shore of a large lake formed in the valley of the Toura, from which the fall for the water-power used in the iron-works is obtained. On the north side of this fine sheet of water a large rugged mass of pinkish-colored rock. "said to be true syenite," rises 350 to 360 feet high, possessing some remarkable magnetic qualities; one small space of only a few feet in extent was pointed out to me, on which the needle of a compass will turn round. We found many crags standing up like crystals,—some not less than 100 feet high, composed of regular courses with pure magnetic iron ore between their beds, varying from one inch to four inches thick. In some places cubes or crystals of iron project from the solid rock three and four inches square; and again, in other portions of these rocks the whole mass seems to be of iron, or some other mineral substance.

MAGNETITE MINES

(66) During the last century large quantities of magnetic iron-ore have been extracted from this place (Kooshwinskoi); and it has been clearly proved by Helmerson, and other mining engineers, from the appearance of fissures on the sides of these hills, that there have been two distinct eruptions of magnetic-ore in this place; and further, that the first great masses of this ore have been cut through, and intersected by similar matter. On the summit of the Great Blagodat there is a small wooden chapel and a tomb erected to the memory of a Vogul chief. "Tchumpin", who was sacrificed and burned on these metallic rocks by his ferocious countrymen, as a penalty for his crime in discovering the mines of magnetic iron-ore to the Russians. The rugged igneous rocks, on which the sacrifice was offered up, make a more characteristic memorial of the event than the cast-iron urn erected upon them. Here I descended a spur of the mountain which juts out in the valley, and scrambled over a great mass of hornblende and other rocks, into a most rugged ravine,—exceedingly wild in its character. The dark purple and greenish metallic colours of these fragments were quite in keeping with a stormy twilight, and the deep shades of evening creeping over the valley beneath. The greater part (of the iron ore) is taken during winter on sledges.

PLATINUM MINES

(76) We turned off to visit the platinum-mines near the crest of the

Oural. The alluvium is found in small ravines or depressions running up towards the summit of the mountain in masses of detritus, composed principally of fragments of serpentine, and small portions of greenstone, drifted down from the higher peaks. The platinum has of late years been found in small grains—formerly it was obtained in fragments of different sizes, weighing from one to twelve ounces, and even more. There is one rare example,—a piece weighing near ten pounds. I was exceedingly fortunate in procuring a curiously formed specimen weighing more than a quarter of a pound.

TAGILSK IRON MINE

(79) Anatole Demidoff (owner of the mines) spares no expense in educating those young men of Tagilsk, or any of his other Zavods, who show any talent for geology, mineralogy, or mechanics.. He has sent several to England and France, allowing them ample means, and affording them every opportunity of pursuing their studies; to some he has already given their freedom, and many of his people in Tagilsk have become wealthy. He has also employed some of the most eminent scientific men of Europe, to survey and examine the mines and minerals of these regions.

Both iron and copper are worked in this Zavod on an extensive scale. About two versts from the works, Vessokgora, or high hill, rises up from three to four hundred feet above the valley; near the top, and on the sides of this hill, magnetic iron-ore has been extracted from a very remote period, most probably ages before the first Demidoff planted his foot on the Oural. The greater quantity is met with in a small valley on the western side of the hill, where it is being worked in an open quarry. Here lies an inexhaustible supply of this valuable mineral. The enormous mass of iron ore found on this spot is about eighty feet thick, and extends about four hundred feet in length. There is material for these iron-works for ages yet to come. Formerly a great difference of opinion was entertained among scientific men about the origin of this mound of mineral. My attendant from the works, a good practical geologist, informed me that there was no doubt these masses of ore have flowed into the valley from fissures in the adjacent hill.

TAGILSK COPPER MINES

(80) About one and a half verst distance from the iron-quarry, the copper-mines exist; the latter ore is obtained by sinking shafts to near three hundred feet deep. It was in the year 1812 that the copper was first discovered at Tagilsk; since that period the mines have been found very productive, and worked to great advantage. The most singular and beautiful product of these mines is the Malachite—the doors, vases, and other works displayed in the Great Exhibition of 1851, made of this mineral, sufficiently attest its varied colour and beauty as a material for works of ornament. On visiting this region I expressed a wish to see this mineral in its natural state; and the Director immediately gave orders that I should descend and see the men at work in the mines. A few years before my arrival in the Oural mountain an enormous mass of malachite had been discovered at Tagilsk, and men were now engaged extracting this mighty metallic stalagmite, the desposit of ages. In the company of one of the managers I visited the mine, and found that a large quantity had already been taken away from this mass, and the miners were engaged in breaking up the remainder.

Could this have been removed in its perfect state, it would have been one of the greatest natural curiosities ever exhibited. I was told that the whole mass was likely, when extracted, to produce about 20,000 poods, or 720,000 pounds of beautiful and solid malachite-worth at least £170,000. Such is the mineral wealth of some of the Ouralian mines, in a region where it is supposed Nature carried on her latest metallurgical operations.* On this vast estate of the Demidoffs, containing 3,095,700 acres, nearly equalling Yorkshire, Nature has been most bountiful. Iron and copper ore appear to be inexhaustible. Platinum and gold are in the upper valleys, and malachite is found there also, in enormous quantities, with porphyry and jasper of great beauty, and various coloured marbles.

JASPER NEAR EKATERINEBURG

(95) From Mostovia to Ekaterineburg is one continued forest. Gold alluvium has been found on the little streams in most, if not all the valleys, and extensively worked, in many instances most profitably. To the east of the road around Mursink lies the region in which the following precious stones of the Oural are found—emerald, amethyst, beryl, chrysoberyl, topaz rose tourmaline, and garnets; all highly interesting to the crystallographer in their natural state, and much more so to the ladies when cut into gems.

In Ekaterineburg—copper money to a large amount is coined annually and sent into Russia. The furnace for smelting gold is in a building connected with the Mint, to which all the precious metals found in the Oural are brought Here they are smelted and cast into bars, and sent to St. Petersburg.

Near these works stands the Granilnoi Fabric—the building in which the jaspers, porphyries, aventurine, and other stones found in the Oural, are made into columns, pedestals, vases and, tables,, unrivalled in workmanship, either in ancient or modern times; the lathes, saws, and polishing-machines used are turned by water-power. The whole establishment belongs to the Crown, and is worked by peasants. The jaspers are found in a great variety of colours; the most beautiful, a deep green, dark purple, dark violet, grey, and cream-colour; also a ribbon jasper with stripes of reddish-brown and green. The porphyries are equally fine and varied —some of most brilliant colours.

Orlite is also a splendid stone of a deep pink colour, with veins of yellow and black; when made into vases it is semi-transparent. Malachite is also used in making tables, and various other articles. The vases are usually of a most classic design—this, with the rich materials in which they are executed, gives them a most magnificent effect; but to be able to fully appreciate such works, they must be seen in the splendid collections of the Imperial Palaces in St. Petersburg.

Most magnificent jasper tables are made in this Zavod, inlaid with different-coloured stones in imitation of birds, flowers, and foliage. In 1853 I saw one of them in Ekaterineburg on which four or fine man had been employed for six years—not an uncommon circumstance; indeed some examples have occupied a longer period. Wages were three shillings and eightpence per month, with thirty-six pounds of rye-flour per month, to make into bread—meat he is never supposed to eat. I have seen another man cutting a head of Ajax, after the antique, in jasper of two colours-the ground a dark green,

*81, Murchison.

and the head a yellowish cream-colour—in very high relief, and intended for a brooch. I have watched men cutting the emerald, topz, amethyst, aquamarina, and other stones into different shapes; which they do with perfect accuracy and in good taste. Some of these brilliant gems have no doubt ere this adorned Imperial Majesty.

EMERALDS NEAR EKATERINEBURG

About twenty-five or thirty years ago, several fine crystals of emerald were discovered by some children, while playing near the village of Takovaya, and were tossed about in the cottage for a considerable time before their character was recognized. At length they were sent to Ekaterineburg, and were most splendidly cut in the Granilnoi Fabric. They proved to be gems of rare beauty and great value. As all precious stones wherever found in Siberia are the property of the Emperor, these ought to have been sent to the Imperial Palace in St. Petersburg; but they never reached the Imperial jewel-case. They were sent into Germany, where they were bought by a Prince of one of the first reigning families. Some years afterwards his consort, on some great occasion, visited the Emperor of Russia, and while staying in St. Petersburg wore these magnificent and rare gems. They were of such surpassing beauty as to attract the notice of the Empress, who admired them very much, and inquired whence they were obtained, To the great astonishment of Her Imperial Majesty she was told they came from Siberia. This caused a great sensation; without giving time for any communication to be made to Ekaterineburg, the Emperor sent an officer to search the works, and the houses of all persons connected with the Graniloi Fabric. He found in the house of the Director General several gems of great value, which the latter declared were there for safe custody. This was thought somewhat strange, as other gems and valuable works were lying at the museum in the Fabric. The Director was, without any investigation, sent to prison, and after many years' confinement died there; nor is it known to this day by whom these emeralds were stolen. In Siberia it is still believed that the man was innocent, but that for the safety of persons of more consideration, it was absolutely necessary that he should be imprisoned; in short, it has been hinted that the offense was committed by parties much nearer His Imperial Majesty. Since this period few emeralds of value have been discovered.

OTHER GEMS NEAR EKATERINEBURG

(106) Amethysts are still found at Tushakalva, a village near Mursinsk; these stones are far superior to the Brazilian amethyst, have a much greater brilliancy, and are more valuable. Beryl is found in several parts of the Oural—some crystals exceedingly fine, of a blue, yellow and rose colour; those of the latter kind are rare, and when perfectly transparent of considerable value. I have seen some splendid specimens in Ekaterineburg, most beautifully cut. Chrysoberyl is met with in the same locality as the emerald; occasionally very fine crystals are obtained and cut into beautiful gems. Topaz is found at Alabaska, and near Maiass; some of these magnificent crystals have been discovered six inches long, perfectly transparent, and sold at a very great price. I have seen fine specimen cut as gems, and exceedingly brilliant. Pink topaz is rare-up to this time only five small crystals have been met with at one of the gold-mines in the South Oural; one of these was presented to me: I deeply regret to say, that it is either mislaid, or

has been lost on the journey. Rose tourmaline is found at the village of Sarapulsk near Mursinsk. This is, also, a rare mineral—I have seen but one crystal pure and transparent. Small specimens cut into gems are sometimes to be got in Ekaterineburg under the name of "Malina sherl". Smoke topaz is met with in many places in the Oural—some beautifully transparent, which they cut into seals of most elegant form. Pure transparent quartz also passes under the name of topaz—large quantities of seals are made of this, and sold in Ekaterineburg, on which the lapidaries cut figures, coats-of-arms, or cyphers, at a very moderate cost. This forms quite a trade, as the workmen employed at the Granilnoi Fabric cut these articles at home in the evenings and holidays, using a small foot-lathe. Malachite is also worked into a variety of beautiful ornaments, such as vases, work-boxes, tables, paper-weights, brooches, and beads, for which they find a ready sale.

Aquamarina is brought to Ekaterineburg from Eastern Siberia. It is obtained near Nertchinsk—sometimes in very fine crystals of great value; these are cut into bracelets, brooches, ear-rings, stones for pins, rings, and other ornaments, and have a most sparkling and brilliant effect. Besides gems and seals, the lapidaries make tables, small vases, and paper-weights, in great numbers, of the different jaspers and porphyries—many of great beauty both in design and colour. Some of the jasper paper-weights have a bunch of grapes in amethyst, with foliage on the top, beautifully executed.

(121) After sketching in Zlataoust and the neighborhood, I visited the mines where garnets and some other rare minerals are obtained.

GOLD MINES

(125) —we descended to the Tchornia —We were now entering into the golden regions; and after passing one small chain of hills, should soon reach Zarevo-Alexandroffsky, lying in a broad valley with several conical hills rising up, of no great elevation. Formerly this tract was exceedingly rich in gold alluvium—very many lumps of solid gold having been found here, varying from one pound to fifteen—then considered enormous masses of the precious metal. Lumps of fifteen pounds weight are unquestionably worth digging for, and perhaps this induced the Emperor to excavate for gold in a part of the mine with his own hands. After digging and delving for somewhat more than an hour, His Imperial Majesty's arms intimated that wielding the pickaxe and shovel was physically more laborious than holding the sceptre. He gave up, having thrown out a quantity of sand from which some gold was washed in small grains. A workman continued the excavation, and at the depth of two feet below where His Majesty left off digging, found a lump weighing twenty-four pounds, sixty-eight zolotniks. To commemorate the event, and point out the exact spot on which His Imperial Majesty laboured as a gold-digger, a small pyramid was erected. These mines continued to be worked with great success for many years. In 1843 another large piece, weighing two poods four pounds, was found at no great depth under one of the old buildings. Years before, they had excavated all around it, little dreaming of the treasure over which the workmen trampled daily. The peasant who discovered this large mass was made free by the late Emperor Nicholas, and a pension granted him for life. It is

only in this valley near a small stream named Tash-kuturgun, and immediately around the works of Zarevo-Alexandroffsky, that the large pieces have been found. In 1853 these mines were still being worked successfully. I was greatly surprised to find the gold alluvium covering the small hills; in some places there were not more than twelve inches in depth of this earthy matter above the rocks, and in many places these elevations were covered with bushes. The workmen were stripping the rocks and sending- their gold-bestudded garments to the washingmachine. Man's thirst for gold
(127) led him hither, and he is rooting up the earth from every crevice—absolutely sweeping the rocks bare, and leaving them bleaching in the sun.

ILMEN HILLS

(155) Our next visit was to Ilmenskoi Lake, in a picturesque region at the foot of the Ilmen hills. After sketching the scenery, I had a ramble over the rocks, which are highly interesting to the geologist and mineralogist. Some years ago the Duke of Leuchtenburg, when visiting this region, ordered excavations to be made in the rocks in search of zircon, and some fine crystals were found. I also made a search among the debris thrown out, and found several crystals, but none were pure and transparent. These rocks had to be blown asunder by gunpowder, when, no doubt, many crystals were destroyed. The following stones are also found in these mountains, —beryl ,tourmaline, garnet, topaz, and sodalite; also fine masses of pure quartz. Specimens of all these stones are cut into gems and ornaments in Ekaterineburg.

ALTAI SILVER MINES

(326) In these works (Barnaoul, Siberia) two hundred and fifty poods of silver are produced annually, —about nine thousand pounds English weight. (this is to give comparison) The whole produce of the silver-mines of the Altai up to the year 1855 never exceeded one thousand poods or thirty-six thousand pounds. To produce this quantity fifty thousand poods of lead were evaporated. In 1850, twelve thousand poods of English lead were sent to Barnaoul to aid in the process. Since that period both silver and lead ore have been found in the Kirghis Steppe in large quantities. The silver obtained in the Altai contains a small portion of gold, with a minute quantity of copper. About thirty poods of gold is extracted from a thousand poods of silver. The greatest quantity of gold obtained in Siberia in any one year was about seventy-five thousand Russian pounds; this was considered enormous, but California and Australia have made it appear small in comparison. There is much of the gold regions yet unexplored, both in Northern and Eastern Siberia.

(335) Smelting the silver is a very unhealthy occupation, and the workmen suffer much from the fumes rising out of the furnaces, which give them lead colic.

MONGOLIA

(456) (In Mongolia). The ridge on which I was standing was a deep red granite, in some places rugged and broken into singular masses. Thick veins of rose-quartz crossed these rocks, running in parallel lines for two miles; some pieces of the quartz were semi-transparent and of a beautiful rose colour. Several of the veins were from nine to twelve inches thick, and others not more than three inches wide.

(463) While riding along I collected numerous beautiful specimens of agate and chalcedony, and also

a few pieces of sardonyx.

(464) I was occupied examining the rocks, and trying to obtain some greenish-yellow crystals, with the assistance of the Cossack. But all our efforts were fruitless—the edge of my geological hammers turned like lead, when struck with force against these rocks.

(472) We were now on the heavy sandy Steppe—part of the Sarkha Desert, which extends into the Gobi —and vegetation was so scant, that even the Steppe grass had disappeared. The small salt lakes have a most singular appearance when seen at a distance. The sparkling of the crystallized salt, which often reflected the deep crimson (of salsola plants) around, gave them the appearance af diamonds and rubies set in a gorgeous framework.

(508) Today we had a beautiful mirage, —an enormous lake appearing stretched out cross the Steppe, with a large city standing on its shore. Tall trees and extensive forests were pictured with so much fidelity that it was really difficult to satisfy the mind that the whole was an illusion. Hour after hour passed away as it kept receding before us, and constantly changing its forms, until at last it vanished.

Editor's Note: A pood equals 36.113 lbs. A verst equals 0.6629 miles.

SCRIBBLINGS OF A MICRO MINERAL COLLECTOR

By ERNEST MARCELLUS SKEA
P. O. Box 46 Pilgrims Rest, Transvaal Union of South Africa

Searching old mine dumps for micro minerals will often prove profitable when there is little prospect of finding hand-size specimens worth the trouble of taking home. There are, of course, mine dumps that do supply one with specimens in hand and museum sizes, some of which are of fine quality, but it is the micro enthusiast who scores more times than not when it comes to gathering choice miner als. What a pleasure it is to find a beautiful little pocket of tiny crystals of some desired mineral in otherwise barren material, the breaking up of which seldom fails to reveal other micros of a like nature.

All collectors of micros know from experience that the tiny crystals and other microscopic features of minerals are often not only far better in quality than those of their larger relations but out-distance them in beauty. For color and perfection the microscopic crystals are supreme. Then again, as is well known, numbers of minerals occur microscopically and never macroscopically, so that nothing less than a pocket lens of about 10 magnification is needed to study their tiny crystals.

To appreciate the full beauty and form of most minerals, collectors of hand specimens who are not already acquainted with the microscopic features of their possessions should at least make a habit of studying them under a good lens, preferably an aplanatic. They will be well repaid for the time devoted to such examination and it is quite possible that of those who do that a fair percentage will want to go further and see how much better the sight will be when viewed through a binocular microscope.

When using a pocket lens it is a good plan not to close one eye as this tends to not only tire but eventually weaken the eye made use of. Keep both eyes open, although one only is needed, and in time it will be found that the free eye will "idle" and not be seeing anything at all. It is unnatural to keep one eye shut whilst making the other do the work, and it stands to reason that prolonged or constant viewing in such a way must affect the working eye in time to come. If both eyes are "broken in" to viewing objects

through the lens, so much the better for it will then mean that each eye can have a rest occasionally.

FIELD COLLECTING EQUIPMENT

Micro collectors are, or should be very careful in handling and carrying home their delicate treasures. The writer carries into the field plenty of soft tissue paper for wrapping purposes and some cotton wool to prevent the jarring for fragile or easily spoiled little specimens when packing them for transport home. Cotton wool should never be used for wrapping specimens in except as a protection after the paper enfolds them. Cigarette tins make ideal containers and a few of them take up little room in the haversack. Corked glass tubes are also useful items to carry with one; but, see that they are protected in a container of their own. Natural History dealers stock handy pocket tins containing six or more corked tubes.

Besides the mineral hammer and a large chisel, if one feels that the latter article is needed, a couple of small chisels, 1/8 and 1/4 inch respectively, are often useful. There is no sense in taking along a chunk of rock with perhaps a solitary patch of crystals suitable for mounting implanted on it. A gentle tap or two against a small chisel is all that is required to free the specimen wanted. In some cases it is inadvisable to attempt to recover in such a way the desired object and it is therefore necessary to hump the guest's host back home as well. The rock slitting machine then comes into action to deal with the unwanted material.

A small notebook and pencil should accompany one because it is unwise to always trust to one's memory. It is much better to record briefly what is observed at the time and so avoid any chance of forgetfulness later.

A small folding camera is easily carried and the pictures taken of scenery and mineral localities visited are constant reminders of happy and healthful days spent out in the open breathing God's pure air.

PREVENTION OF MOULDS

Mould, one of the bugbears of naturalists resident in damp situations, made its appearance on the inside of many of the writer's micro boxes, but, fortunately, did not form on any of the specimens or their supporting corks. After removing the corked mounts and brushing out the mould the boxes were thoroughly dried and many of them used again. After a time the mould (fungus) appeared again in the boxes, some being badly affected, and for a second time the cork mounts had to be removed. The writer then thought of formalin and made up a 1% solution of same. The boxes were again brushed free of all visible signs of the pest and well dosed with the formalin solution, a camel hair brush being used to paint the boxes with. The mould has failed to re-appear, the formalin having done its work satisfactorily. Do not be sparing with the solution and do not be afraid to thoroughly dampen the boxes should your own ever become infested. The boxes are sturdy little things and will come to no harm as a result of the treatment. As the writer's mountain home can be very damp at times, thanks to a moisture laden atmosphere, all new micro boxes are now treated with the formalin solution before use.

The writer has often wondered whether Bakelite micro boxes would not be even better than the present cardboard ones. The lid, of course, would have to fit so as to grip the box. Paper labels for data could be gummed on the outside bottom of the box and on the inside and outside of the lid. Think it over American micro mineral collectors!

GEOLOGIC FEATURES OF THE WHITESTONE BRIDGE

By THOMAS W. FLUHR

The Whitestone Bridge, spanning the East River between Old Ferry Point in the Borough of the Bronx and Whitestone in the Borough of Queens, provides the latest link connecting the extensive new arterial highway systems of Long Island with those of the Bronx and Westchester counties.

This bridge, begun in June 1937 and opened to traffic on May 29, 1939, was built under the direction of the Triborough Bridge Authority of the City of New York at a cost of $18,000,000.

The river, at the point of crossing, is 3300 feet in width, with a distance of 2250 feet between the officially established pierhead lines. This unusually graceful suspension bridge was given the award of the American Institute of Steel Construction for Class A bridges built in 1939. It has a center span of 2300 feet, end spans of 735 feet, a clear height of 135 feet above mean high water at the channel near the Bronx shore, and a maximum clearance of 150 feet at the center. The approach viaducts consist of plate girders supported by concrete piers.

Because of the great depth of the overburden at the sites of both the pier and the anchorage near the Queens shore, the construction of the foundations for these structures required the sinking of open caissons by dredging to depths greater than any heretofore attained in this section of the country.

As a preliminary to design, geologic surveys at the sites of the main piers and anchorages were carried out by means of diamond drill borings. A study of the dry samples and rock cores thus obtained revealed a relatively simple geologic structure, the two main features of which were the bedrock and the deposits of unconsolidated material forming the overburden. Of especial interest is the great depth to bedrock at the Queens end of the bridge; a depth so great that the use of pneumatic caissons was out of the question.

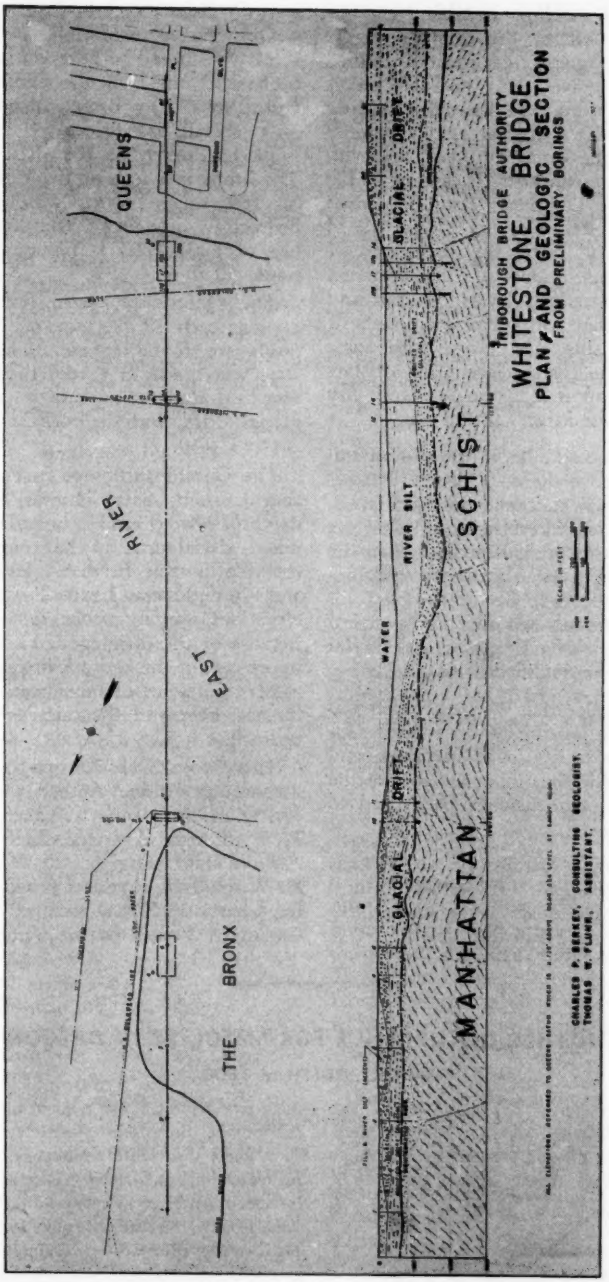
BEDROCK IS MANHATTAN SCHIST

The bedrock embraces several varieties of rock, but all belong to the Manhattan Schist formation. It is of interest to note that this is the first instance reported of the occurrence of this rock formation on Long Island. In places there is considerable disintegration and decay of the upper part of the bedrock. Some of this may be due to surficial weathering in pre-Glacial time, the residue of which was not entirely scraped away by the movement of the Glacial ice sheet. In addition there may have been occasional weaknesses or possible crush zones responsible for the presence of some of the disintegration and decay. A small amount of such disintegration and decay was found at the sites of the Bronx pier and anchorage, but at the sites of the Queens pier and anchorage the extent of such disintegration and decay was much greater.

An uncommon variety of rock was found in the core from one of the borings, which differed so greatly in character from the remainer of the cores that thin-sections were made and studied petrographically. The rock was of igneous derivation, being a basic dike intrusive into the Manhattan Schist. Its original minerals, probably feldspar, pyroxene, and olivine, had been altered into an aggregate of serpentine and chlorite. Subsequent to this alteration, the rock was fractured and then silicified, the interstices being filled, and part of the serpentineous material itself being replaced by silica, thus cementing the fractured rock, giving it back some of its original strength.

OVERBURDEN OF VARIED ORIGIN AND CHARACTER

The overburden was of varied origin and character. The deposits most recent in time include river silts and artificial fill, neither having much bearing value. Most of the overburden, however, is of glacial origin, both glacial till, and modified



Plan and geologic section of the Whitestone Bridge which connects the boroughs of the Bronx and Queens (the latter on Long Island) in the northeastern part of New York City.

glacial drift being represented. The glacial till, left by the thawing ice, is made up of unassorted and unstratified sand, clay, gravel, and boulders. It is tight, impervious, and has good bearing value. A rather thin layer of this material is found at the Bronx approach site, with a much greater thickness over most of the remainder of Old Ferry Point. Modified glacial drift underlies the glacial till in the Bronx and forms the major part of the overburden in Queens. This formation consists of stratified layers of sand and gravel, together with varying amounts of fine sands, silts, and clays, with some boulders. The coarser layers are satisfactory for support but the silt and clay layers will sustain very little load.

At the Queens side of the project immediately above the rock floor are layers of "blue clay" and sand and silt layers, some of which carry traces of plant remains. These deposits are older than the modified drift just above and may represent either the Gardiners Clay, or earlier Cretaceous deposits. For practical purposes their characteristics are similar to those of the modified drift.

It was decided that the overburden was inadequate in bearing power for the support of the heavy loads involved, and that the pier foundations, and that of the Queens anchorage, should be carried to sound bedrock.

The geologic features of the site, as interpreted from the exploratory borings, which were made by the Standard Drilling Co. are shown in the drawing.

PIERS REST ON CAISSONS

During construction the geologic features were found to be essentially as had been determined by the exploratory investigations. The Bronx anchorage rests on a concrete base fifteen feet thick which is placed directly on the glacial deposits. The Bronx pier rests on two caissons, each 38 feet square which were carried to bedrock by dredging. The presence of a bed of plastic clay is reported at elevations -50 to-60.

The Queens pier also rests on two caissons each 38 feet square. Recent deposits are found to elevations -102 to -104 where a 2 to 4 foot thick layer of peat is found, below which is modified glacial drift, with bedrock at elevations -142 to -150.

The Queens anchorage is supported on four caissons. Soft silt was found to depth of 30 feet, and is underlain by modified glacial drift. A layer of clay was reported in this between elevations -50 and -70 and sound bedrock was found at elevations varying from -150 to -164. Because of the disintegrated and decayed upper part of the bedrock it was necessary to blast out some of this material in order to seat several of the caissons on sound bedrock.

This project was carried out by the Triborough Bridge Authority, of which Mr. O. H. Ammann was Chief Engineer, E. W. Stearns, Assistant Chief Engineer, Allston Dana, Engineer of Design, Col. H. W. Hudson, Engineer of Construction. Dr. Charles P. Berkey acted as Consulting Geologist, assisted by the writer.

ANOTHER OCCURRENCE FOR MESOLITE IN OREGON

By MRS. EDITH McLEOD

In the November, 1940 issue of ROCKS AND MINERALS, the article on page 378 "A Mesolite Locality in Oregon," states that the mesolite found on Mt. Pisgah in Lane Co., may be the first known occurrence for the mineral in the state.

This is not the first known occurrence as there is a deposit of the mineral in Derby (we call it the Brownsboro district), in Jackson Co., where this white zeolite has been known for years, though it, too, has been erroneously named, natrolite, by many collectors. So the Lane County mesolite will have to take second place while the Jackson County mesolite is given the top honor.

GEOLOGY OF THE ROYAL GORGE AREA

By F. C. KESSLER

Canon City, Colorado

"Forbidding?" Yes, that is the word to use in describing the Royal Gorge area in the days of the early white man. Those who have seen the Royal Gorge and the Skyline Drive at Canon City, Colorado, understand very well why Lieutenant Pike in 1806 detoured fifty miles north into South Park and then back to Salida when he led the first expedition of white men up the Arkansas River and into the Rocky Mountains. Major Long in 1820 sent a number of his men up the river, but they turned back at the Royal Gorge. Captain Fremont in 1845 also detoured around the Gorge on his way up the Arkansas. He went thirty miles south through Wetmore and the Wetmountain Valley in order to find a way through the mountains. These men were experienced explorers. They knew precipitous mountains and would not trespass where Nature had posted her "Keep Out" signs so profusely.

Imagine, if you can, the dismay of the early settlers when they suddenly found themselves confronted with a sandstone hogback six hundred feet high, running from the Front Range on the north to the Greenhorn Mountains on the south. This hogback is now the scenic Skyline Drive. Immediately back of it is the Royal Gorge, more than a thousand feet deep and only forty feet wide at the bottom, through which the Arkansas River flows full-width. "No chance!" must have been their expression as they turned their oxen around with a crack of the whip and lumbered back down the river again.

These stories reached Washington principally by word-of-mouth, but, fragmentary and incomplete as they must have been, they fell as seed upon fertile soil. Geologists began to assume that probably the sandstone hogbback was the re-appearance of the Cretaceous system that passes under the Tertiary about midway across Kansas, Nebraska, and the Dakotas.

Long before the bureau of the United States Geological Survey was organized as it is today, Dr. J. V. Hayden was sent west by the Department of the Interior and was assigned the momentous task of examining the geological, mineralogical, and agricultural resources of the Territories east of the mountains and to ascertain the age, order of succession, relative position, dip, and comparative thickness of the different strata and geological formations, and to examine with care all the beds, veins, and other deposits, of ores, coals, clay, marls, peat, and other minerals; also fossil remains of the different formations, and to make full collections in geology, mineralogy, and palaeontology to illustrate notes taken in the field.

Dr. Hayden began his work in Wyoming and followed the hogback along the Front Range through Colorado and far into New Mexico. In the Arkansas Valley the hogback makes a great bow to the west, right up to the east portal of the Royal Gorge where it crosses the river and turns east again to its general north-south course along the Greenhorn Mountains. This bow to the west is known as the Canon City Embayment of which the Doctor says, "These ridges afford peculiar facilities for working out the geological structures of the country. Indeed, they are like the pages of an open book upon which the geologist can read what the Creator has written uopn each formation known to the country, from the granite mass that forms the nucleus of the loftiest mountain range to the recent Tertiary inclusive. Often in a little belt from one-half to four or five miles in width, one may travel over the upturned edges of nearly all of the formations in the geological scale."

Reference to the accompanying diagram will show that eight of the formations of the thirteen usually accepted periods of geological time occur here. Of eight periods that occur, four may occur in their entirety, namely, the Cretaceous, Jurassic, Triassic, and the Ordovician.

The entire Cretaceous system is repre-

sented along Skyline Drive by the Dakota sandstone, Benton shale, Niobrara shale, Pierre shale, and the Fox Hills sandstone.

The Jurassic may or may not occur in its entirety, since so little is known of that period on this continent. However, it is all here unless there is a disconformity at its contact with the Triassic, because extensive areas are exposed in Garden Park, some of which are fossil bearing. Vertical cliffs show the entire occurrence in cross-section, but research is lacking as to the classification into upper, lower, and middle Jurassic.

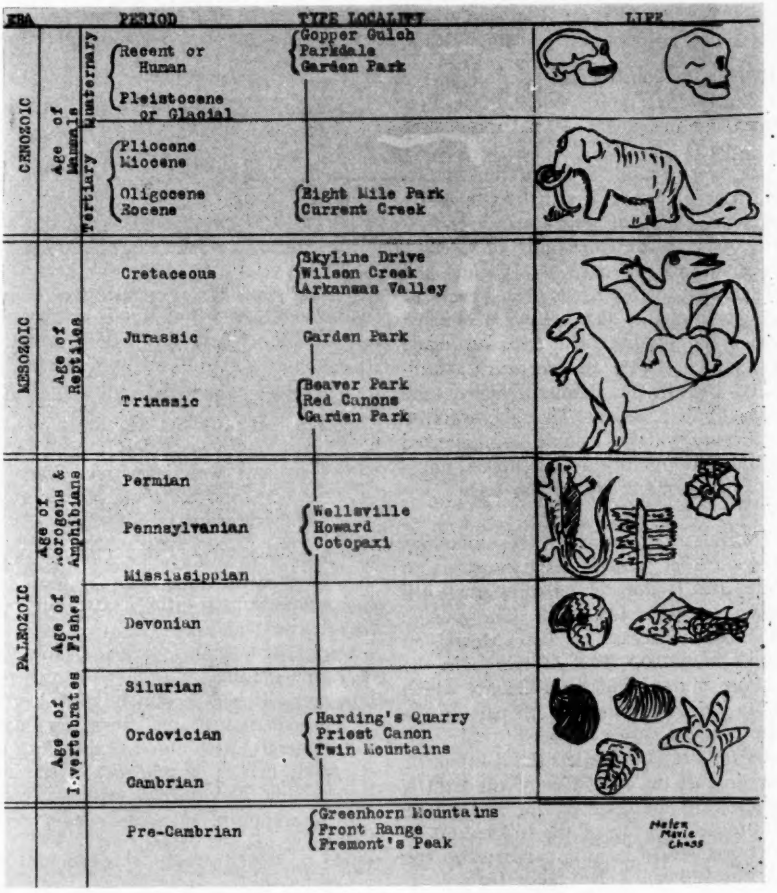
Many square miles of the Triassic is exposed, but since the formation here is entirely barren of fossils, accurate classification is difficult. It occurs in coarse sandstone of a brilliant red color, carved by differential erosion into grotesque forms and figures which receive more tourist comment than any other scenic feature.

The Ordovician occurs in its entirety, lying unconformably on the Pre-Cambrian. The lower Ordovican, or Manitou, is rich in fossil phyllopods, echinoderms, orthoceras, and brachiopods. The middle Ordovician, or Harding sandstone, contains fresh water remains of several sorts, while the upper Ordovican, or Fremont limestone, is rich in bryozoans and corals.

The Royal Gorge area is the type-locality of twenty-eight of eighty-four species and genera of vertebrate fossil remains referred to the entire west. Vertebrate palaeontology in the western states was entirely neglected up to the early seventies of the past century, but after the publication of the report of the first expedition of the United States Geological Survey by Dr. Hayden, palaeontologists began to enter the field. In 1877 and 1878 Professor Cope of the Academy of Science at Philadelphia, and Professor Marsh of Yale University came west to dig in this very fertile field, Professor Cope arrived first, but soon had a neighbor, Professor Marsh, busily digging less than a quarter of a mile away, both of them trying to be the first to uncover a large fossil. While they were engaged in this friendly rivalry, they were visited by Dr. Hayden, then chief of the United States Geological Survey. The activities of these noted men have made the Royal Gorge area world famous in the history of palaeontology.

Today colleges and universities bring their science classes here for field research, but not afoot, as Lieutenant Pike brought his men up the Arkansas, nor by ox-drawn schooner as the early settlers came. The modern scientists come at sixty miles an hour, park their cars, and do in a few days what it took others whole seasons to accomplish.

The great hogback that extends along the base of the Rocky Mountains for a thousand miles or more, is the shore of an extensive inland sea that covered the Great Plains and much of Colorado during the Cretaceous period. In late Cretaceous or early Tertiary time orogenic movements folded the Front Range into a ridge that tilted the whole eastern slope of the Rocky Mountain area toward the Mississippi. This, of course, was a process of gradual elevation since no traces of vulcanism can be found. Severe erosion has taken place in the mean time and since the Triassic formation, locally known as the Red Beds, consists of a soft sandstone, it has eroded out more rapidly and consequently has left a trough between the base of the Front Range and the hogback, or the old sea shore; therefore, the tributaries of the Mississippi from the west are principally superimposed streams. They have cut their channels through the hogback and through the Front Range as well. Since the Arkansas is one of these tributaries, superimposition accounts for the fact that the river has cut its channel, a part of which is the Royal Gorge, through almost the exact center of Fremont's Peak, while the base of the peak is from one thousand to two thousand feet lower. The Peak is of Pre-Cambrian formation, consisting chiefly of schists and gneisses, cut through by several pegmatite dikes. One dike on the north can be traced for several miles along the moutain-side. Its chief mineral is feldspar, which is mined extensively by the Colorado Feldspar Company. Associated minerals are mica, beryl, garnet, and tourmaline, all of which go over the dump to the delight



GEOLOGY OF THE ROYAL GORGE AREA

Eight geological systems occur in their entirety or in part within an average fifteen mile drive from the Royal Gorge.

of the mineral collector.

The term type-locality in the accompanying diagram is used in a local sense, meaning the section of the Royal Gorge area in which the outcrop of the respective formations occur. Twenty-three of these localities are given and since a number of them designate areas of exposures several square miles in extent, it is evident that the area is a fertile field for study of the earth sciences.

In contrast to the early days when the explorers came and found themselves outdone by nature's own attempt to please, the area is now equipped to invite the tourist. The Denver and Rio Grande Western Railway passes through the Royal Gorge, where its trains stop ten minutes to let the passengers enjoy the scenery. U. S. Highway 50 passes through the area with improved side roads leading to Cripple Creek and Westcliffe where the history making gold mines are located.

A RESERVOIR QUARRY IN CONNECTICUT

By PETER ZODAC
Editor, ROCKS AND MINERALS

During the construction of the dam for the Morris Reservoir, southeast of East Morris, Conn., about 1932, some very fine quartz crystals, especially smoky quartz, were found. Some of the crystals were four or five inches in length, nicely terminated, and of gem quality. Specimens seen in th collections of Messrs. Edwin M. Chase, of Kent, Conn., and Robt. Nesbit, of So. Kent, Conn., were of such good quality that we were induced to visit the locality. The trip was made on Sept. 23, 1937, and we were accompanied by Mr. R. Emmet Doherty, the Association's president. Though we found the locality without trouble and collected a number of interesting specimens, not a single good quartz crystal was seen.

Location

The quarry from which the stone was taken out that went into the construction of the dam is atop the adjacent small hill known as Sugar Loaf Hill. The dam is 2.4 miles southeast of East Morris on Conn. Route 109. East Morris is in the southern part of Litchfield County which county is in the northwestern part of the state.

Sugar Loaf Hill borders the dam on the west, in fact the west pier of the dam is anchored in the base of the hill. The elevation of the top of the hill is 760 ft. above sea level; its original base on the east was 580 ft. (Data taken from U. S. Topographical map).

Geology

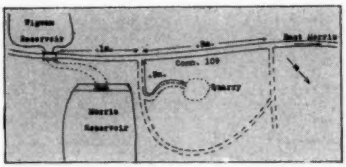
The rock in Sugar Loaf Hill, at least what was exposed in the quarry, consists of granite and pegmatite. The quarry is about 200 ft. in diameter with walls 35 ft. high.

Mineralogy

The following minerals were noted in the quarry:

Albite: White, as a constituent of pegmatite; also colorless, crystallized but poor in quality.

Beryl: A large mass weighing about 100 lbs. (part of a huge crystal) was found by Mr. Doherty. It was pale green in color but heavily stained by limonite, nevertheless, some good specimens were available. Some of the beryl showed spots of pale green gemmy aquamarine.



Sketch showing approximate location of quarry atop Sugar Loaf Hill in reference to Morris Dam and Conn. Route 109 (Not to scale)

Biotite: Black flakes in pegmatite, some on beryl.

Columbite: Small black masses in pegmatite.

Garnet: Red grains, poor quality, in gray granite.

Limonite: This is common as yellow to brown stains and crusts on many minerals. Also noted as thin lustrous platy masses on one rock crystal and as tiny dark brown crystals (pseudomorphs after pyrite cubes) on a smoky quartz crystal.

Microcline: Flesh-colored cleavable masses in pegmatite; also forms graphic granite with smoky quartz.

Muscovite: Crystallized in pegmatite.

Quartz var. Rock Crystal: None found by us but some nice loose crystals, 3 inches long and 1½ inches in diameter, nicely terminated but incrusted with limonite, were given us by Mr. Chase.

Quartz var. Smoky: Common as a constituent of pegmatite; poor crystals also found by us but not of good quality. Mr. Chase presented us with some loose crystals which varied from light smoky to very dark and all nicely terminated. The underside

of one squatty crystal was encrusted with six tiny limonite crystals (pseudomorph after pyrite cubes).

Acknowledgments:

The writer is deeply grateful to Messrs. Chase and Nesbit for the privilege of examining their specimens, for crystals given him (by Mr .Chase), and for the information on the locality. Aside from its beautiful quartz crystals, Sugar Loaf Hill is also noted as another locality for beryl, a mineral which has made Connecticut famous.

RARE MINERAL FOUND NEAR CAMDEN, MAINE

During the week of Nov. 10, 1940, Dr. Millard B. Long, of Camden, Me., an amateur collector and a member of the Rocks and Minerals Association, was instrumental in the finding of a rare mineral —holmquistite The mineral occurred as a bluish-black mass in a loose boulder, about 2x1 feet in size, that was found in a field on the Cripp's farm; the farm is 3 miles west of Camden on the Camden-Augusta highway. Unfortunately, only one boulder containing the rare mineral could be found and most of it went into the construction of an outdoor fireplace—Dr. Long collected but a few small bits of it.[1] One specimen reached Harvard University where it not only was identified as holmquistite but due to its rarity has been placed on exhibition in their mineralogical museum.

The find, like many others, was made accidently. A friend and neighbor of Dr Long's Mr. Fred Swan, has an outdoor fireplace which is made up of bright colored rocks which he had been collecting for several years. Each rock was trimmed and polished before being inserted in the fireplace. One day he chanced to spy a bluish rock in a stone wall on the Cripp's farm, which meeting his requirements as to color and hardness, he took along with him and had it trimmed and polished by a local stone cutter. When Dr. Long saw this specimen, on Nov. 10th, it looked so odd to him that he collected all the small chips left over by the cutter. He could not identify the mineral and neither could Mr. Swan who by the way is neither a collector nor in any ways interested in minerals. Nevertheless Mr. Swan was induced to send a nice specimen to his son, in Boston, Mass., from whom it reached Harvard University where its identity was established.

Holmquistite is a lithium-bearing variety of amphibole which was first found on the Island of Uto, in Sweden; it has also been found at the hiddenite mine,[2,3] Hiddenite, near Statesville, N. C. The Camden, Me., occurrence is the third locality in the world for the mineral.

The Camden holmquistite is undoubtedly of glacial origin as the rock in which it was found is foreign to the mica and andalusite schists and the quartzite which are the country rocks of the area around Camden.

Camden, on the west shore of Penobscot Bay, is a village of about 3500 population (1930 census) in the eastern part of Knox County which county is in the southern part of the State.

Dana[4] lists the following minerals as occurring in or around Camden: chiastolite, epidote, galena, magnetite, pyrite, talc, and tourmaline (black).

1. A nice polished specimen of the rare mineral was sent the Editor of ROCKS AND MINERALS by Dr. Long.

2. *The biddenite deposit in Alexander County, North Carolina,* by Charles Palache, S. C. Davidson, and E. A. Goranson. Am. Min., Aug. 1930, p. 292.

3. *Descriptive list of the new minerals,* 1892-1938, by George Letchworth English, McGraw-Hill Book Co., Inc., New York, 1939, p. 102.

4. Dana's *System of Mineralogy,* John Wiley & Sons, New York, 6th Ed., 1892, p. 1054.

NEW ENGLAND NOTES

Conducted by Rudolf C. B. Bartsch
36 Harrison St., Brookline, Mass.

Townsend, Mass. There is an old "pink" granite quarry located here which has been shut down for several years. The mineral collector, however, can find many interesting specimens on its dump. Excellent microline crystals may be found up to several inches in diameter with fine terminations. Microline, of a light green color, is also to be secured and some transparent material is occasionally found suitable for cutting into moonstones. Perhaps the most interesting mineral available is magnetite. This occurs in striated octahedrons in the pegmatite and in the granite itself. Crystals up to an inch in diameter are to be found.

Newbury, Mass. The famous old Chipman mine was worked for lead and silver from 1874 to 1879 and was reopened in 1918 and worked until 1921. Gold was also found sparingly.

There is, however, a large amount of material available to the collector on the dumps and in the sheds. Excellent specimens of ankerite and siderite are plentiful, much massive pyrite, galena and lesser amounts of sphalerite, covellite, etc. The galena runs from a very fine to coarse granular in texture; the ankerite from yellow brown to black in color. Chalcopyrite and tetrahedrite are also reported from this working but no recent finds have been made to my knowledge. The records show a small production of copper during the operations.

Devil's Den, Newburyport, Mass. This is an old limestone working with some dumps. Very fine specimens of precious serpentine may be found in the dumps with a little hard work. The color ranges from a light olive-green to deep greenish-black. It is translucent and takes a fine polish, often very slender veins of asbestus cut across specimens with an occasional small amount of arsenopyrite to make it still more interesting. Another very beautiful combination is the yellow-green serpentine with essonite garnet on a background of white limestone. Good specimens of wollastonite may also be found in the dumps. These minerals may all be seen on the walls of the quarry but are more of less badly weathered. Digging over the old dumps will yield fine material.

West Roxbury, Mass. Known years ago as Welch's Ledge and now as the West Roxbury Tray Rock Quarry, this old working at times yields very interesting material for the mineral collector. The two most interesting minerals are calcite and pyrite. No crystals of calcite have ever been found to my knowledge but fine cleavage material is occasionally run across of a reddish, streaky color. Pyrite is always available in some form or another. Many cubes may be found entirely coated with red hematite. Very fine groups of sparkling micro crystals are common in small cavities. Recently superb groups of large crystals have been found in a calcite vein. After the calcite is removed there remains groups of brilliant crystals of pyrite some of which are very perfect cubes with groups of quartz crystals.

Plainfield, Mass. Recently I received a letter from a collector finding fault with me because I failed to mention pyrite as being found at the rhodonite locality at Plainfield, Mass. Of course pyrite does occur here but in such a poor and uninteresting quality that is not worth mentioning. I make no claim to mention everything found at any particular locality. It is my aim to call attention to the really good things that may be found at any locality listed in these notes. Other collectors may find good minerals which I do not list but if they do not tell us about them how are we to know? Furthermore, if Dana's *System of Mineralogy* mentions a certain mineral as occurring at a given locality, it does not mean that fine specimens of it may be found there.

New Educational Motion-Picture Films Tell Story of Lead Mining, Milling, Smelting and Refining

The mining, milling, smelting, and refining of lead are interestingly portrayed in two recent additions to the educational film library of the Bureau of Mines, United States Department of the Interior. The films which were prepared in cooperation with one of the large lead companies, each require about 30 minutes for projection and are available only in "sound."

The first picture, "Lead Mining in Southeast Missouri," opens with animated drawings that show the location and geologic features of the southeast Missouri lead belt, where the most extensive lead-mining operations in the United States are conducted. These are followed by scenes which re-enact historical pick- and-shovel methods of mining and the operation of a Scotch-hearth type of furnace used in early smelting operations. After a portrayal of the development of diamond drilling in the region, scenes of present-day methods, fully described by narration, show a shift of miners being lowered in the shaft to the working level and then transported to the working face; the operations of drilling, blasting, loading with dynamite, and firing the charges in a development drift; electrically operated underground loading of the broken rock; and its transportation to the waste dump. Ensuing scenes show underground pumps, which force the collected seepage water to the surface, an underground power station, machine shops, and a theatre with miners assembled for a safety lecture. These are followed by scenes which show removal of ore from a stope, including drilling, firing a dynamite charge, an electric shovel and a dry scraper loading ore, several impressive views showing the magnitude of the underground workings, transportation of ore to the shaft, automatic weighing and dumping ore cars at the shaft pocket, hoisting, and dumping at the surface. This picture ends with views of a safety meeting and some of the features of community life in the region.

The second picture, "Lead Milling, Smelting, and Refining," depicts the steps and processes for converting the mined lead ore into useful and marketable products. The ore is coarsely crushed, weighed and sampled, and conveyed to storage bins at the top of the mill. When drawn from the bins the ore is screened, ground in rod mills, classified, and separated on shaking tables into concentrates, middlings, and tailings. The middlings are returned to the grinding circuit; the tailings are dewatered by "chat drags" and sent to tailing ponds; and the concentrates are dewatered by rotating vacuum filters and started on their way to the smelter. The slimes from the chat drags are thickened and sent to pneumatic flotation machines, where chemicals are added to make particles of the ore come to the top with the froth created by jets of compressed air in the flotation tanks. The lead-bearing froth is cleaned, dewatered by vacuum filters, dried in a gas-fired drier, and loaded into box cars ship ment to the smelter. At the smelter the concentrates from the tables and the flotation machines, after sampling for assay, are mixed and sent to a sintering machine in which part of the sulphur is burned, leaving a porous cake or clinker. This is crushed and resintered, reducing the sulphur to about three per cent. The final sinter is mixed with coke and slag and charged into blast furnaces, which are operated continuously in three eight-hour shifts, seven days a week. Waste gasses from the blast furnaces are conducted to a bag house where any lead products are filtered out. In the blast furnace, the heavy lead metallics and heavy matte settle to the bottom, while the lighter slag rises to the top and is tapped off periodically. Matte is tapped from the bottom and granulated by pouring it into a high-pressure water stream. The molten lead is also tapped off at the bottom of the blast furnace, and after a preliminary skimming of the dross, is sent to the refinery, where silver is recovered and the remaining lead is cast on a rotating casting wheel into one-hundred-

pound pigs, which are loaded for shipment to the market. The picture concludes with scenes portraying some of the unfamiliar uses of lead and lead products, which play such an important part in modern life.

Copies of these films, in 16-millimeter sound, are available for exhibition by schools, churches, colleges, civic and business organizations and others interested. Applications for the film should be addressed to the Bureau of Mines Experiment Station, 4800 Forbes Street, Pittsburgh, Pennsylvania, and should state specifically that the borrower is equipped to show sound film. No charge is made for the use of the film, although the exhibitor is expected to pay the transportation charges and for any damage to the film other than normal wear.

SHOSHONE ICE CAVERNS OF IDAHO

By W. T. BAXTER

In a recent issue of ROCKS AND MINERALS, a request was made for notes on ice caves known to readers. Perhaps the following notes may prove of some interest.

On our trip through the West in 1938, Mrs. Baxter and I went out of our way considerably to visit the Shoshone Ice Caverns of Idaho. These caverns are located in southern Idaho, in a volcanic section, about 50 miles north of Twin Falls. They are very little publicised and unless one looks closely he will pass by the small sign on the highway pointing to the road that leads over lava rock to the caverns.

A guide who lives near the caverns told us that the ice is found in a tube leading from a nearby volcano; part of this tube has fallen in places.

One descends down into the caved-in part of the tube, which is like an open pit, and goes directly down an ineline to the iie caverns. The ice here is crystal-clear and solid, a number of feet deep, and covers the floor of the tube. Back some distance one encounters a solid wall of ice which completely fills the tube save for a small bit near the top. The guide stated that this wall of ice extended back to the extinct volcano. The guide also stated that though many people have seen the caverns not one had offered an explanation for the occurrence of ice.

The floor of the cavern is gradually rising each year, according to the guide, and this is borne out by the fact that one can now see objects down in the ice which a few years ago were on top.

Editor's Note: Mr. Baxter enclosed three photos of the ice caverns one of which showed a view of the third chamber whose total length is 300 ft., width 60 ft., and height 30 ft.

The Shoshone Ice Caverns are in the northwestern part of Lincoln County, 14 miles north of Shoshone and 1 mile west of U. S. Highway 93.

There is another ice cave in Idaho, in the eastern part of the state, but we know nothing about it except its location. It is in the eastern part of Clarke County, 7 miles northeast of Jacoby, between Camas Creek and a highway leading to Idmon, 8 miles to the north. The cave may also be located as 16 miles northeast of Dubois, the county seat of Clarke County. Clarke County borders on Montana.

A NEW LOCALITY FOR AXINITE IN MAINE

By LEO NEAL YEDLIN

A new locality for axinite in Maine has been found at the Bath Town Quarry which is located about 1 mile west of the town of Bath on U. S. Route 1, in the southwestern part of the state. The mineral was found in a seam of limestone running through the southern part of the quarry and occurs as small crystallized masses of a brownish-purple color, associated with masses and small crystals of diopside.

Herb Haven, Ike Skillin and I (all of the Maine Mineralogical Society) were out looking for crystals of vivianite reported from the quarry; none were found but the new discovery of axinite, November 7, 1940, assuages our disappointment.

COLLECTOR'S KINKS

Collectors are cordially invited to submit notes from their experiences and so make this department of interest to all.

A "SHATTERED" KINK!

It very often happens that some brittle minerals, like quartz, shatter easily when hammered. Sometimes the scattered portions of such minerals are very annoying —they are difficult to remove, will not fall away of themselves, and if left alone mar the appearance of the specimens. The shattered particles seem to be wedged in and it is often after a long and tedious process of picking them out with a pin or knife point that they may be removed.

Mr. Ernest Weidhaas, of Pelham Manor, N. Y., has solved this problem in a very simple and most satisfactory manner. The instrument he uses is neither a pin nor a knife but a common, ordinary piece of adhesive tape. He cuts off a strip of the tape slightly longer than the shattered area of the specimen and presses the adhesive side down firmly over the broken particles and—taking hold of one end of the tape he rips it off smartly. To the tape the shattered mineral particles adhere somewhat as iron filings do to a magnet. If this does not clean the specimen completely, additional sticks of the tape are applied until no particles remain.

In this manner, in about four or five minutes, a specimen can be easily and nicely cleaned. Try the method on your next specimen!

Mr. Weidhaas, by the way, has one of the finest mineral collections in the country. He has three specialties that we know of: prehnites, freaks in minerals, and minerals that fluoresce. Of course he is a member of the Rocks and Minerals Association.

. . . Club and Society Notes . . .

Newark Mineralogical Society

The Newark Mineralogical Society held its Silver Anniversary Meeting on Sunday, Dec. 1st, 1940. Naturally the subject under discussiono was silver, the metal.

Dr. Paul Walther, of Elizabeth, N. J., exhibited a large number of very fine silver specimens. Others who brought nice specimens were Messrs. Louis Reamer, of Orange, N. J., and William Broadwell, of Newark, N. J.

Mr. Richard Milburn, former President of the Society, suggested a program for the ensuing year which was adopted by the Club.

The January Meeting of the Society was held on Sunday, Jan. 5, 1941, and was given a lecture on fluorescence by Mr. Louis Reamer. Mr. Reamer is thoroughly conversant with the subject and had expanded considerable effort in the preparation of his talk which was illustrated by many demonstrations and examples.

The next Meeting of the Society will be held on Sunday, Feb. 2nd, at 468 Orange Street, Newark, N. J., at 3:00 p. m., and the program will be on Essential and Strategic Minerals. Visitors are welcome.

Geo. E. Carpenter,
Chr. Publicity Comm.

Plainfield Mineralogical Society

A regular meeting of the Society will be held on Tues., Feb. 4th, at 8:00 p. m. in the Plainfield Public Library, Plainfield, N. J. The guest speaker will be Mr. John Vlismas, noted lapidary of New York City. whose topic will be "Demonstrations on Cutting and Polishing."

On Sat., Feb. 15th, a trip will be made to the American Museum of Natural History, in New York City, to examine the famous collection in the Mineralogical Hall. Dr. Frederick Pough of the Museum will be host and leader.

BIBLIOGRAPHICAL NOTES

Geology of Coal, by Otto Stutzer (Translated and revised by Adolph C. Noe).

Dr. Otto Stutzer, Late Professor of Geology and Mineralogy at the School of Mines, Freibery, Saxony, was one of the world's foremost geologists. In 1914, his authoritative work, *Kohl,* based on his extensive researches on the coal fields of western Europe, a region in which there is coal of many varieties, ranging from the low-rank brown-coals of Tertiary Age to the Carboniferous anthracites, was published in German and it became instantly popular. Now for the first time this scholarly work is available in English and it is destined to be a volume of major importance to geologists and coal-miners everywhere.

The book is divided into nine chapters, each a masterpiece in itself.

Chapter I-Defination of coal. (pp. 1-2)

Chapter II-Coal as a rock: survey of the chemical and physical properties of coal. (pp. 3-50).
On page 20 it is stated that molybdenum, manganese, zinc, lead, cadmium, copper, gold, and silver have been found in coal.

Chapter III-Microscopic examination of coal. (pp. 51-87).
This also includes the preparation of thin sections and the preparation of polished coal surfaces which should be a chapter of great interest to amateur lapidaries.

Chapter IV-The origin of coal. (pp. 88-126).
This also includes the origin of the individual varieties of coal.

Chapter V-The processing of coal. (pp. 127-131).
We learn that coal is used for many purposes—as a fuel; for the extraction of coal tar, coal-gas, etc., as a dye, for jewelry, etc.

Chapter VI-Origin of coal beds. (pp. 132-183).
The many good photos in this chapter add great interest to the value of the text.

Chapter VII-Stratigraphy of coal deposits. (pp. 184-239).
A few paragraphs in this chapter are devoted to useful minerals appearing with coal as galena, kaolin, siderite, sphaerosiderite, fire clay and oil sand.

Chapter VIII-The petrography of coal beds. (pp. 240-322).
On pages 286-288 are listed a number of the many minerals that have been found in coal. These are pyrite, marcasite, millerite, cinnabar, malachite, copper pyrite, bornite, sphalerite, galena, phosphorite, barite, halotrichite, and sulphur.

Chapter IX-Disturbances of coal beds. (pp. 323-426).
Foldings, thrusts, faults, water, glaciers, and igneous rocks, all have influenced coal deposits in one way or another.

It is a pleasure to recommend to our readers this very interesting and very instructive book on coal which contains 461 pages and 198 figures. It is written in not too-technical language, has many good photos and illustrations and is an authority on the subject. The book should be in the library of every geologist, mineralogist and mineral collector.

Published by the University of Chicago Press, 5750 Ellis Ave., Chicago, Ill. Price $5.00 a copy.

MINERALS YEARBOOK 1940:

This intensely interesting publication of the U. S. Bureau of Mines presents an economic review and statistical summary of the mineral industry of the United States in 1939. It reviews current trends in production, consumption, prices, stocks, technologic progress, world conditions, and international trade for nearly one hundred metal and mineral commodities. It includes a survey of the bituminous-coal industry, furnished through the courtesy of the National Bituminous Coal Division. In response to the wide public interest in the problem of providing adequate supplies of minerals needed for national defense, the new Yearbook summarizes the domestic situation with respect to the more important strategic minerals that must be obtained in whole or in large part from foreign sources. The record of nonferrous metal production is presented in authentic detail with final statistics for 1939 for every State. An enlarged chapter presents the results of an expanded survey of nonferrous secondary metals. Complete final statistics for 1939 are presented throughout the entire volume with the exception of the chapters on bituminous coal, petroleum, natural gas, and natural gasoline, and these chapters contain adequate reviews based on preliminary data. 1514 pages, cloth.

For Sale by the SUPERINTENDENT OF DOCUMENTS, GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. Price $2.00 in U. S., Canada, and Mexico; $2.50 in other foreign countries.

. . Collectors' Tales . .

By PETER ZODAC

UNKNOWN AT HOME

A story is told of a very popular collector who is employed nights as a mechanic in a hotel garage in a small Connecticut city. He is known all over the country and many collectors call on him but in his own city he is—well let us tell the story.

One day a collector, residing in Philadelphia, Penn., sent him a letter requesting an appointment, asking for an early reply. A week went by without the writer receiving an answer—another week passed with similar results Even the third week produced no reply. Completely puzzled why no answer was received, the Philadelphian (who knew the Connecticut collector personally and well) made the trip anyway and on reaching the little city at night went straight to the garage and—there was the collector at work.

"Why didn't you answer my letter?" the Philadelphian demanded of the garageman half in earnest and half in jest.

"Your letter!" was the startled reply to this unexpected question when the garageman looked up and finally recognized the person addressing him. "Why, I never received it. When did you send it?"

"It was sent three weeks ago."

"How did you address it?"

"It was addressed in care of this hotel."

Excusing himself for a moment, the garageman, after brushing himself off and washing his hands, went into the hotel, which was adjacent, and inquired of the clerk at the desk if there was a letter for him (giving his name).

Glancing through the pile of unclaimed letters the clerk picked one out and handed it to him with the remark that it had arrived about three weeks ago.

"Well, I'll be hanged," muttered the garageman to himself as he walked dazedly out of the hotel. "Here I have been working 25 years for this outfit and they do not yet know who I am!"

ALASKA'S GREATEST YEAR FOR GOLD PRODUCTION—1940

With total gold production valued at approximately $25,375,000 during the past year, Alaska hit an all-time record which surpassed even the great gold rush days, W. C. Mendenhall, Director of the U. S. Geological Survey, said on Jan. 1, 1941, in making a preliminary report of the Territory's total 1940 mineral production to Secretary of the Interior, Harold L. Ickes.

This amount is nearly $2,100,000 more than the value of gold output in 1939 and brings the total value of gold production in Alaska, from the beginning of recorded mining in 1880, which was 13 years after the Territory was purchased from Russia for $7,200,000, to the present, to about $561,311,000.

1940 production of other minerals besides gold, including platinum metals, tin, antimony, quicksilver and coal increased in quantity and value. The entire production of all minerals for the year was valued at approximately $27,658,000—nine and one-fourth percent more than in 1939.

The 1940 production brings the total value of all minerals produced in Alaska since 1880 to more than $830,000,000, Director Mendenhall stated.

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Handbook For the Amateur Lapidary by J. H. Howard. 16 chapters covering all phases of gem cutting and polishing, 141 pp., 44 illus., price $2.00. J. H. Howard, 504 Crescent Ave., Dept. R., Greenville, S. C.

How to Collect Minerals. By Peter Zodac. A guide book for the collector, 80 pp., 15 ills., $1.00. Rocks and Minerals, Peekskill, N. Y.

Fifty Back Numbers of Rocks and Minerals Magazine, all in good condition and all different, $10.00. If you have back numbers send a list of them with your order and we will try not to duplicate any of them. Rocks and Minerals, Peekskill, N. Y.

FOSSILS

Fossils, Minerals, Old Arms, Indian Beaded Trappings. prehistoric specimens, general line of curios. Lists 10 cents. N. E. Carter, Elkhorn, Wisc

EXCHANGES

I WANT TO EXCHANGE MINERALS. CAN OFfer fayalite, forsterite, thorite, triphyllite, heterosite, manganapatite for good specimens from other localities. Gunnar Bjareby, 147 Worthington St., Boston, Mass.

Exchange 100 lbs.—Sphalerite, calcite or calcite crystals for 100 lbs. massive chalcopyrite. Buskett, Joplin, Mo.

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Scott Rose Quartz Co.—Rose Quartz, Black Hills specimens. all kinds and colors; for rock gardens, cabinets, etc. Boxes: 24 specimens. $1.00; 18 specimens, 50c; 15 specimens, 35c. Postage paid. Box 516, Custer, S. Dak. Send stamp for price list.

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Gold Ore Specimens: Six genuine samples from famous mines, with descriptive booklet, only 25c. Hardrock, 710 Federal Blvd., Denver, Colo.

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Minerals, Fossils, Indian Relics, Books, Coins Curios, Stamps. Old Glass. Catalogue 5c. Indian Museum, Osborne, Kansas.

Uvarovite—Choice specimens. Minute brilliant emerald-green crystals coating ore. For details write: H. Goudey, Jamestown, Calif.

"The Finest in Tri-State Specimens: Octahedral Galenas, Ruby Sphalerite, Spearpoint Marcasites, Twin Sphalerite xls, Calcite groups, bulk ores, Cerussite xls. Write for prices, Boodle Lane, Box 45, Riverton, Kansas.

New England minerals for sale or exchange. Correspondence solicited. Rudolf C. B. Bartsch, 36 Harrison St., Brookline, Mass.

Mineral Specimen Cabinets—15 to 100 specimens. Prices 35c to $10.00. Cabinet specimens—free price list. Charles O. Scott, 739 Colorado Ave., Trinidad, Colorado.

Arizona Minerals for sale and exchange. Luther Steward, Phoeniz, Arizona.

Collectors! Do you want to exchange minerals with other collectors? Your exchange ad inserted here will contact them. Send it in today!

SPECTROSCOPES

Spectroscope For Quick Ore Analysis $2.50. Cuffing Sons, Campbell, Calif.

MISCELLANEOUS

Wanted Immediately—Used equipment to set up amateur lapidary shop, K. J. Albrecht, U. S. Patent Office, Washington, D. C.

Valuable Quicksilver Property in southwest United States for sale or lease. T. T. D., c/o Rocks and Minerals, Peekskill, N. Y.

New Mounting Method—3c stamp brings specimen green lepidolite and list. General Science Service, 1815 Lyndale, Minneapolis, Minn.

Wanted: Books, one each, Merrill's, **Non-Metallic Minerals.** Ladoo, **Non-Metallic Minerals.** Bayley, **Elementary Crystallography.** Thompson, Williams Lane, Chevy Chase, Maryland.

Wanted to Buy: Highest prices paid for gold and plated broken and discarded jewelry, watches, spectacles, gold teeth, etc. Remittance sent promptly. B. Lowe, Box 525, Chicago, Ill.